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THE SOUL OF THE UNIVERSE by Gustaf Stromberg Editorial Review

It was Eddington who started the present spate of cosmologies with his popular but difficult volumes, The Nature of the Physical World. Since then Jeans, Millikan and others, including even Dr. Einstein, the source-spring of this effort, have collaborated in making the new scientific attitude better understood. We were grateful for all these explanations, yet they left us unsatisfied. There was something shadowy about the whole thing. Even writers like Crowther, equipped with the courage to make a synthesis of whole domains such as biology and physics could give the cosmos little substance. Our gratitude for such works was more for the facts than the conclusions.

What made these stirring books inadequate is now evident from a reading of the latest of them all, Gustaf Stromberg's lucid volume, The Soul of the Universe. It is, without doubt, the finest of its kind. Its conspicuous virtue is the spiritual meaning it derives from the very heart of the subject matter. Man is given a place in things. He is shown not surrounded by God nor directed from without, but as a natural essence of the cosmos. Stromberg's treatment of this aspect of the subject is striking. These are the days of Relativity, not of heliocentricity, and still less of earthy egocentricity, yet not a few of these First Cosmologists have put themselves on record as supposing that this may well be the only planet in the cosmos occupied by so-called intelligent beings. Stromberg is impersonal, cosmocentric, and the wonderful result is that he makes a living thing out of space-time, and man a deeply imbedded part of the heart of absolute divinity.

This is achieved by reminding us that atomic structures are accompanied and directed by a sort of guiding mist of waves without energy, sometimes called the ghost field. Stromberg then transfers this concept to the chains of genes in the chromosomes, and thus places the human ovum and all that obtains from it upon an immortal basis in time-space. He faces right up to the issue that life as well as energy must then be latent in space, and follows through to useful ethical conclusions, and to the idealistic end that the bodiless waves are the cause, not the result, of material goings-on. Partly because the book is so clear and forthright, and partly because the writer gives full emphasis to the wonder and immanence of life, the reader has deep satisfaction over such passages as this (in italic in the original, pp. 144-5): "...as the matter of the earth is part of the original matter of the universe, so the life on the earth is part of the original life in the universe."....."Ova genes of many kinds exist in cosmical space. They have conveyed the elementary hereditary characters to the living organisms on the earth. They can exist and can retain their properties, even when they are not associated with matter."

We associate ourselves (in all modesty) with Einstein's hearty commendation of the book. And we feel a little ungracious in bringing up one exception which, nevertheless has a wide application. The Soul of the Universe does not come to grips with what might be called the interspace between the process of space-time ideation and physical outworkings.

All through western thought runs a fatal assumption, that the final, stark reality will be found just under the outward seeming we experience. This is what vitiates our philosophies, and makes them in some ways more beggarly than primitive thinking. The ghost world of animists has the merit that it is in natural relation to this world, and modern depth psychology has made this idea acceptable in principle. The lack in the tribe-man is that he doesn't go on, further back into the heart of things. For him there are no space-time absolutes. Civilized man makes exactly the reverse error. Putting aside a few cold mathematical serial universes such as Dunne has advocated in his books, we have offered to us a physical universe stretched immediately over space-time. We miss the luminous world of the psyche which, with the archetypal possibilities of soul and dynamism of spirit, is in perfect consonance with the best of mathematics and biology. In other words, there may be two or three variants of time, as there are three rectangular dimensions to space, as Bergson saw even in pre-Relativity days.

Our pleasure over Dr. Stromberg's book is large. And it includes a sizeable admixture of anticipation, for we think The Soul of the Universe marks a new period in cosmology, less shadowy, less empty, less a-moral and less egocentric. We anticipate a great synthesis of thought that will bring together the old and the new, the eastern and the western, the inner and outer---something so natural that it will be erupting all over the place from the integrated real that lies under the turbulent present. F.K.

THE SOUL OF THE UNIVERSE, Gustaf Stromberg, McKay, Phila., 1940, pp. 237, $2.00

PSYCHO-BIOLOGY ITEMS: General

The pressing problem in general biology is a clear recognition of what.....is the living substance. In default of this recognition, the questions of how life begins, how it is continued, and how transmitted will remain unanswered. Thus, knowledge of protoplasmic structure is basic for these, as yet unsolved, problems of general biology. To obtain a conception of this structure demands a concerted attack by biologists, chemists and physicists who appreciate the limitations of the life-state, the range of normal life-processes. We need a biology that recognizes its field and the problems peculiar to it and which treats these according to its domain and what that domain embraces. - E. E. Just on Unsolved Problems of General Biology, Physiol. Zool., Biol. Abs. 12864.

Cell reactions in Agardhiella, cambium, the formation of spicules of sponges, Microstomum, and insect galls of plants show a spatiotemporal orderliness of a nature not yet described in physico-chemical terms and seeming to require directive control. To seek to bring such control under experimental analysis is a proper aim of natural science. We are not justified however, in extending to problems of daily life the assumption required in scientific research that the only reality is ponderable. I. F. Lewis on Cell Reactions in American Nat., Biol. Abs. Oct. 1940, 12841.

The living organism is presented as a definite, portion of the universe maintaining its separate individuality by virtue of the partitioning effect at its internal arrangement. The degree of organization varies in a related series from the complexities of the simple cell to the manifold modifications exhibited by man. The concept of effective partition moreover, is based substantially on the evidence presented by the plasma membrane and the phase boundaries of colloidal aggregates. Emphasis is placed on the dynamic nature of the characteristic equilibrium and attention is called to the continued formation of effective partitions at varying levels of equilibrium. Further investigation of the significance of these partitions presents many interesting implications.

Difficulties are encountered in extending such a description to include the mental and psychical phenomena, although fundamental stabilities exist. It is obvious that a synthesis of this sort is, necessarily, incomplete. Condensed from K. S. Rice on The Significance of Effective Partitions, Acta Biotheoretus, Biol. Abs. Oct. 1940, 12843.

Specific anti-hormones of gonad and thyroid products are discussed in Biological Review, 1940...

The Young-Helmholtz theory of red, green and violet vision by three sets of separate receptors in the mammalian retina is supported by W. E. Le Gros Clark, (Nature, 26/10/40)

Problems of Nervous Anatomy, by J. Bolke is highly recommended in a review in Nature (2/11/40). The reviewer speaks of the book as giving "...evidence of the mature judgment, open mind and breadth of vision of the man who has succeeded Cajal as the doyen of neuro-histologists."

Definite conclusions that electric currents, and not only heat, are raised in vascular and non-vascular tissues by diathermy is reported by K. F. Nagelschmidt (Nature 2/11/40, p. 590).

For some time blood has been collected for transfusion and separated into two parts, plasma and solids, by centrifuges something like milk separators. The plasma alone does not need typing, but it is not adequate for all cases requiring transfusion. Now a new technique is used (Professor J. R. Marrack, Nature, 2/11/40). After centrifuging the proteins are dried to a powder, and mixed as required with the plasma, forming a water-dilutable waxy solid. This is among the advances in knowledge since 1918, when information about hormones, vitamines, etc., was extremely small. War accelerates certain kinds of inquiry; eventually we hope human growth may reach a point where there will be as keen a concentration on human welfare during peace. One wonders, also, whether this juggling about with the liquids of life, in our present state of knowledge, may not bring forth a great many problems. The sudden steep rise in influenza reminds us of the like disaster in the last war. What are we doing to ourselves ? If the human inner psychic nature has a reality of its own and survives death (and exists potentially before birth), the adjustments mankind makes in the physical organism may make strange disjunctions entirely unsuspected by us. We must never forget that the replacement of one metal for another---a single atom for atom replacement in each molecule---makes the difference between chrolophyl and haemoglobin. In the face of such incredibly refined natural processes the happy-go-lucky mixing of vital mortars by man seems just a little headlong. Yet needs must when war drives.

OF TWINS & TIME — PSYCHO-BIOLOGY ITEMS: Man

Twins are one of the phenomena which press us urgently to study the psychic worlds as time envelopments of the space domain. The environment is almost entirely identical for both during gestation, and continues a good deal in common in early years. Thus inheritance and environment combine to produce like products. And the close likeness of one-egg (identical) twins as against fraternal twins strengthens the hold of physical explanations. But another explanation would be preferable if it were to cover the cases of very like development and conduct in twins separated for years. Lately new data has come forward, principally from the publication of Dr. H. H. Newman's book, Multiple Human Births, last October, and from sources as the Klahr Children's Clinic at Temple University School of Dentistry, Philadelphia, where records of twins have shown as many as twenty three almost identical dental cavities in

almost the same places. Telepathy between twins is very common, and differs from special telepathic communications of shock, or fear or fright. The International Twins Convention, which had its ninth annual meeting in St. Louis this year, provides interesting material, which will be valuable when reported with greater exactness than the convention is equipped to accomplish. There are Convention accounts of twins writing examinations in separate rooms but in nearly uniform terms; of twins separately and without ordi. ary communication taking like decisions in life.

Dr. Madge Thurlow Macklin of London, Ontario, has made recent studies of fifty-three pairs of identical and thirty five of fraternal twins, and confirms the earlier data that show twins parallel one another in cancer incidence, identical twins more than fraternal. (N Y Times 1/12/40)

The choice is clear, between two theories. The view of mechanical materialism regards the ovum as a fated particle, whose chemistry and physics determine about everything. This is a brain cracker, for we are to presume that if the whole human race were born on a twin basis, then all the similarities of these linked couples would be the result of materials that could be put into a gallon jug, the approximate volume of the ova that give birth to a generation of the earth's humanity. Would it not be really much simpler to consider that some aspect of man, say the psyche, is living in a time-like environment parallel to the physical, in which experiences can be enjoyed in common through life despite space-separation ? Why should not the time-dimension have properties as varied as those of space ? By attributing reality and separable existence to the psyche a variety of data can be explained such as the tendency for long-married couples to die of the same non-infectious diseases (reported by Dr. Antonio Ciocco in the current Proceedings of the National Academy of Sciences) and the indisputable fact of influence by the psyche over organic and somatic responses.

Aging a time product, is interesting in the above connection. When the organism has come to maturity, it has capacity for rebuilding lost tissue, for adaptation, even for recovery from severe inroads into health. Why then die ? Science (Nov. 1940) reports that the National Institute of Health is organising a new unit to inquire into this, "continuous biologic phenomenon," of dying. A number of these problems would be much simplified if the time-dimension could be seen to have properties. Aging is a psychic as much as a physical process. Minerals age very little, and very slowly. They do not have an excited psychic life. Vegetables display the longest life-epochs, and the lowest psychic order in the strictly biological realm. Animals live intense lives and die the sooner. There is incontestable evidence in parapsychology, of prescience of the violent death of organisms provided by what purport to be human personalities which have survived death themselves. (The latest of these is in the current Jour. of the Am. Soc. for Psychical Research, Nov.,1940, pp. 345-350). When these are accepted, we must face the fact that psychic changes are seen in people about to die. How is it known the body is doomed ? The psyche-in-time-space appears to be as much an organism as is body-in-space-time.

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ESP TODAY

PSYCHO-BIOLOGY: Man

Pursuant upon the publication of Extra-Sensory Perception after Sixty Years by J. B. Rhine, J. G. Pratt, B. M. Smith, C. E. Stuart and J. A. Greenwood (Holt, 1940), the first-named has published, in Scientific Monthly, November, 1940, an extensive review which cannot be adequately reported here, although important because the author brings us back to the turning---many think it a wrong turning---in European thought taken when Aristotle was rediscovered and erected into the Philosopher, and the far more profound attitude of Plato was overlooked. Dr. Rhine makes

it quite clear that habit of thought and too-widely extended assumptions about what is and is not possible enter into judgments about extra-sensory perception. We would add that the question is much larger than this, with social and therapeutic issues of urgent import. Some studies have recently been made of the place of animals in the dreams of adolescents by J. Aichele (Psych. Abstracts 4987 October), in which he concludes that the increasing replacement of animals by machines is resulting in "impoverishment of the soul". Habits of thought tend to make us interpret such matters as fantasy or merely physical. But have we the right to assume that there is no reality to psychic inter-change with animals, in the face of the many recorded connections between computing horses and dogs and their masters ? (See Jour. Am. Soc. for Psych. Res., June, 1940). There may be as much a psychic carry-over from animal to man as physical-animal ancestry in evolution, required to explain the Freudian complexes.

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"TIME TO ONESELF." A DIGEST.

Americans lose much by not withdrawing more within themselves to enjoy the fruits of solitude. Mary Ellen Chase, professor of English at Smith College writes in Yale Review, Autumn, 1940, that we as a people do not spend enough time alone. Like all other good things, Nature is not to be discovered by those who travel in herds. We are as a people either unused to being alone or actually afraid of it. We are losing our self-possession, our individuality, our personal dignity. We have become people, not persons. Before we venture to praise or to condemn anything, we are too apt to look about for someone to stand by us in case we are on the unaccepted side of the fence. After years of this, we shall be as afraid to die as we have been afraid to live.

In order to gain from the world of experience and of people, we must frequently withdraw from it to find new experiences within ourselves. Confidence in ourselves and strength from some Power greater than ourselves can come to us only in quiet and solitude. Alone, we can search for what we once were and for what we might be if given the chance.

Only the man who can live and love in solitude can live and love well in city streets. The power to withdraw within oneself can and should be exercised at will in crowds. Miss Chase resolved to spend at least a half hour each day entirely by herself. She learned that to look at a single tree for ten minutes reveals a personality hitherto completely unnoticed. That merely to wait quietly, seemingly without thinking, is sure to bring its sudden and bright reward. She had more to give to others from the unexpected gifts which she had received in solitude. Each member of a family should spend some part of each day by himself, by so doing married couples regain their identity as persons instead of pairs. Children left at times alone develop resources within themselves, respect themselves and their own decisions. For the man who has learned the secret of solitude, as for the prophet, the solitary places rejoice and the desert blossoms with the rose.

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If your temper and nerves get edgy when a storm is approaching it is probably because the water balance in tissues in your body actually is disturbed due to falling barometric pressures outside. Advancing this likelyhood, Dr. C. A. Mills of the Univ. Cincinnatti College of Medicine, advocates that scientists should closely investigate body changes thus involved when stormy weather brews.

Suicides are more likely to occur when a storm center approaches, Dr. Mills stated. Domestic troubles flare up more readily. It is harder to think clearly. Even animals become more inclined to fight. With declining outside pressure, tissues take up water and swell, much as does a sponge, while with rising pressures they give up water and shrink. In girth measurements of his own leg just below the knee, he observed changes of half an inch or more with major weather changes, and some people changed several pounds in weight. (Scientific American 96, 340, Dec. 1940)

SUPPLEMENTARY NOTE ON THE TERM PSYCHE

In connection with psychophysical matters, it will be desirable to standardize the use of the word psyche, which has been given a new sense by Freud and others. We do not mean it to be soul in the large sense, nor in the sense of the Good, the Beautiful and the True by Plato. Taken in conjunction with the three familiar complexes, ego, herd and sexuo-physical or survival, it can be equated to intellectual, emotional and vital processes at mental, conative and etheric levels. We propose so to use it; shortly, all personality or anima except the physical body, and distinguishable from true soul or animus. It is also desirable to call attention to a standard we wish to set up to keep the readers mind clear on the relative subtlety and inwardness or decreasing grossness of states of energy (matter). As we are writing from the physical point of view (however exalted may be our conceptual level in thinking) the less gross is the sub-level. We shall accept as a useful term etheric for the level of vital energy such as is seen on the nerves to evoke the action current. This enables us to distinguish between the gross physical organs and the vitality which animates them, without any assertions of dualism, however. The etheric then would be sub-physical. There may well be states subtler then etheric, sub-etheric. Emotion is something of this character, since it is clear that endocrine activity results from emotional states. The result of the emotions can be measured in the action current, itself a result of the intermediate nerve current. All the foregoing usage is not to carry with it any dogmatic assertions, or assumptions of false simplicity, but is merely a convention (based no doubt on patent fact) to enable us to have common ground in reading for and in MAIN CURRENTS. F.K.

FIJIAN FRONTIER, by Laura Thompson ANTHROPOLOGY: Editorial Review

Facts significant for the understanding of culture are brought out in this vivid picture of life on Kambara, an island of the Fiji group. Of special interest to the student of religions is the idea that religions are not simply imposed dogmatically by priesthoods, but have an intimate social relation, so that it is not possible to disturb religion without breaking up societal structure. Dr. Thompson does not speculate whether a religious system has grown out of a pre-existing societal structure or whether it has molded the society, or whether(as seems likely to the writer) this is a hen-egg dilemma. What is here reported is the intimate nexus between two levels of human thought and action, a religious-ideational level and an orderly pattern of behavior in society.

Thus in Fiji under the old regime "individuals obtained social status from clan ranking---a status ultimately derived from the supernatural sanction of ancestral deities. Christianity removed clan rank from the control of the native gods, and prestige began to depend upon social rather than supernatural sanctions. This brought the individual to the fore and pushed the clan into the background. The individual could now rise in the social scale regardless of clan affiliation. Social mobility became possible to a far greater extent then was permitted by the more rigid structure of ranked clans in the original society." But just this mobility upset and modified the class structure. The effects of white education can likewise be best understood in relation to the societal structure. The progress of Christianity was furthered by its falling in with the ambitions of the class of chiefs. For white education to progress it must likewise accord with native values. Compare our own society, especially its more prestige-conscious sections. Dr. Thompson's findings "show clearly that careful investigations of culture change will aid in the intelligent administrations of native peoples." (The quotations above are from the review by Dr. Ford.)

FIJIAN FRONTIER, Laura Thompson, 153 pp. 7 pls. 2 maps, Institute of Pacific Relations, Honolulu, 1940. Reviewed in American Anthropologist, Oct.-Dec. 1940, by Clellan S. Ford.

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ANTHROPOLOGY: Items

Finding a stratified corner at the Lindenmeier, Colorado, site, a camp and workshop occupied by Folsom Man in the Ice Age, Dr. Roberts, Smithsonian archaeologist, estimates the Folsom Man arrived at this camp sometime between 10,000 and 25,000 years ago and more likely 25,000. Their weapons were the beautifully shaped and grooved Folsom dart points and they sewed their garments with eyed needles. (Ice Age Americans Science News Letter 38,326, (1940)

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A Franco-Belgian expedition has reported (Alfred Matraux, in Ethnology of Easter Island, Honolulu, Bishop Museum Bulletin 160) that the development of the giant statues may be assumed without interpolating a sunken continent or an earlier race than the present stocks, and equates these strange remains to other specialties in the Polynesian islands. This does not explain the means by which these monsters were cut and moved and erected, nor their fairly uniform anatomy, nor how such an undertaking was carried out by the small number of people the present island could support, nor why the work is so evidently left unfinished. What is wanted for Easter Island is dredging and diving exploration below its littoral, and a study of all aspects of its contemporary and archaic life forms, and its geology.

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A careful and very interesting account of an economy built round the cow and the ox is summarised in a notice of A Description of the Modes of Livelihood and Political Institutions of a Nilotic People, by E. E. Evans,-Pritchard. (Oxford. Univ. Press, 1940) in Nature (2/11/40). These total economies are of the greatest importance to serious students of current world-problems, which arise from blind efforts to settle a world-economy round the mass production machine. A bovine ecology and tribal economy are here one and the same entity, just as a six-cylinder gas-engine technology and a world-wide social order are parts of the same current historical picture. Here we have a people, south of the point, where the Nile, Sobat and Bahr el Ghazal meet, among whom cattle are money, and whose money has to follow grass. Our money follows markets also, and the export surplus of the United States has constituted the wandering cows of this country. Those cows which wandered to Asia and Europe, are nearly all pretty well dead. If we want to penetrate the fog around our economics we would do well to encourage study of a little scientific social anthropology.

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Dr. A. H. Compton at the meeting of the American Physical Society reported that the intensity cycle of the cosmic rays appears to be about twenty eight days, approximately the same as the cycle of the sun's rotation and of the lunar month. The primary rays comes from outer space. The cyclic modulation may be due to solar or terrestrial causes. When the sun and moon were in line at the recent eclipse, the incidence of cosmic rays there was reduced.

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Science News Letter supplies us with the first photographs of the new electron-stream microscope. Readers may also consult Time (28/10/40). As the wave-lengths employed in the new instrument are small, something like 100,000 diameters of magnification are being achieved, and actual difficulties of determining what it is that is being seen arise. Large molecules are within range, it is supposed. The most important use we can now anticipate for the new extension of vision is probably in study of the genes, and of electrical polarization of living cells and tissues and micro-organism, because electro-therapeutic methods are of high and growing importance. Red corpuscles are known, from work done at the Cold Springs Harbor Biological Laboratory, Long Island (Science, 31/7/36), to have a high electrical as well as oxygen efficiency. It has been suspected that chains of lethal organisms may collect under forces similar to those seen in magnetized iron. An entirely new approach to many problems in all branches of thought may be anticipated, if objects such as viruses and molecules can be brought into view.

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The wide attention given to Dr. W. G. F. Swann's address at the National Academy of Sciences was focussed upon his description of the "wiggling knottiness" of the atom, its freedom form determination. The general interest in this issue indicates a demand for philosophy. As to freedom of the will, if we humans haven't got it, we rejoice to find the atom has. It turns out that the amount of freedom the atom has is small, since its unpredictable movements are confined to a time-space cloud of guiding waves of minute compass. It is as if a human being were surrounded by a psychic fog which actually determined his course, because it responds to the psychic streams of energy of which it was made up, while the physical man inside the psychic cloud proclaimed his voice-full freedom---and just trailed along, all the same !

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Of late years mathematical physics has shown a tendency to absorb chemistry. The launching of a Rheologists' Club in London (Nature 2/11/40) marks the establishment of a new department of the field of physical sciences. Rheology is the study of the properties of solids and liquids and intermediate states. Much of the data arises from the plastics, and new attitudes are emerging. Elasticity in solids is equated to viscosity in liquids, so slowness of molasses in January becomes bounce, if it is slow enough. Thixotropy, allatancy, fibrosity and oiliness are other properties examined in rheology and discussed by G. W. Harrison in the place cited.

An interesting item in this field is the determination that rubber consists of atoms curled into compact molecular coils, which draw out into crystals when stretched and return to coils when released. (N.Y.Times 8/12/40, reporting work done by Dr. H. M. James, Purdue, and Dr. Eugene Guth, Notre Dame). Once more the whole question of the place of crystals at the bottom of the life-heap comes forward for attention.

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The familiar process of determining the presence of atoms or elements by the spectroscope is now being paralleled for molecules. Each element is identified by a series of color lines peculiar to itself. Norman Wright of the Dow Chemical Company described to the American Chemical Society (N. Y. Times, 29/10/40) a spectroscope for molecules using a prism of rock salt and radiant heat. The material under examination absorbs those heat wave-lengths peculiar to itself and thus its character is recorded. The relation of heat to molecular motion has long been known. The infra-red spectrometer is new. When all possible molecules or forms of matter have been mapped (if ever !) it may be possible to analyse any substance with this instrument.

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An article dealing with the origin of the earth by Dr. Henry Norris Russell, chairman of the department of astronomy at Princeton University, appears in Scientific American for November, 1940. We summarize certain aspects. In the sun's energy-production, Bethe has shown that hydrogen is the fuel, helium the ashes, and carbon and nitrogen the materials for a chain of reactions between them. The six steps of the reactions have all been shown in laboratory form. The heavier isotope of nitrogen which is involved is 800 times more abundant on the earth crust than the sun, so the earlier assumption that the earth is from the sun's center may have to be abandoned, for this and other reasons. At present, therefore, the conclusion is that there was a more primitive state of the universe, "antedating the existence of the stars", and the sun's surface and its interior have not been much mixed. We have now a third view, of these origins: 1. The earth may be from the outer layer of the sun or a companion star (Lyttleton); 2. Or from an earlier cooler stage of the sun's interior; Now, 3, we may suppose there was an early epoch common to both planet and sun, prior to their individual formation. Dr. Russell had previously explained the decline of the encounter theory, which has now passed from view along with the old nebular hypothesis. (See Scientific American, March 1940). The course of reasoning here is based upon the stability of the lighter elements, and is not affected by the examination of meteoric iron reported to the American Physical Society (Herald Tribune, 24/11/40) by Drs. G. E. Valley and H. H. Anderson of Harvard, which shows it to be identical with earth iron.

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A photometric study of the effects at a distance exerted by metals on a photographic plate (Russell effect) has enabled the author to obtain quantitative results. These results show that Russell's explanation, that the effect is due to oxygenated water produced by the contact of wet air with the metal, is insufficient to account for the phenomenon. It is necessary to suppose the existance of a very absorbable radiation emitted by the metal. Action of metals on photographic plates. J. A. Reboul, Jour. de Physique et la Radium 1,55-62 (1940).

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" An important contribution to the story of the geologic development of Yellowstone National Park, Wyoming, is expected from the recent invention of a physicist, Dr. Robley D. Evans, of the Massachusetts Institute of Technology. Hitherto but little could be deduced as to the actual age, expressed in years, of various lava flows, although their placement, layer upon layer, gave clues to their relation to one another. Through the invention of a special furnace which breaks down the rock into its various elements, it is now possible to transform solid rocks into a gasious state. The degree of heat is terrific, reaching 2000 degrees Centigrade. The results of such tests upon rock specimens will determine within 5 percent the age of each lava flow." (Taylor Rochester, page 18, 30 No. 1, Summer 1940)

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There are two opposite types of biological islands in the world: first, those which are left when the continent of which they were mountain peaks have sunk; second, those which were marine islands and are now elevated portions of a continental mass. (There is of course also new land.) A fascinating report upon the biological islands which are scattered about Mexico, Island Faunas on the Mexican Plateau, by Professor Edward H. Taylor of the University of Kansas before the Eighth Annual American Science Congress at Washington last May appears in Nature, current. One area, for instance, has 64 species of snakes, toads, frogs and lizards not found elsewhere in the world, and no salamanders. Another, 200 miles east of the former, has 31 reptiles and amphibia (with salamanders). There are dozens of these highlands, and the only explanation is isolation in ancient times, since rainfall and such factors are not variant enough to explain the phenomenon. "Much of the evolution of Mexican animals took place prior to the uplift of the highlands" and these biological islands of today were then truly islands. It has been customary to look upon Easter Island as the opposite type, a peak left from an old continental mass, now mostly subsided. There will have to be considerable advance of knowledge before the inter-relation and history of present land masses is understood. Geology, biology, linguistics (especially as applied to place names), anthropology---great sectors of science must come more closely into a system of thought, before matters of this kind can be unified with finality.

Types of bacterial nitrogen-binders unlike the varieties well known in temperate zones have been dug up from the perpetually frozen dark slime of lower depths of eastern Siberia and revived in nutrient media after inert some 20,000 years. The work was under the direction of P. N. Kapterev of the Academy of Sciences of the USSR. (Moscow News 26/6/39) (Bacteria are generally regarded as the lowest forms of vegetable life.) The term low, used of bacteria and protozoa, means that the organisms are simple; and they traffic with time in a manner different from that of higher organisms. It becomes more and more evident that unicellular plants and animals resemble crystals in both these senses, and differ from crystals by reason of their high psychic content. A bibliography upon the psychic life of micro-organisms will be offered with MAIN CURRENTS shortly. The advanced experiments of Russian plant breeders, seen at the All-Union Agricultural Exhibition, the instruments for agricultural study devised at the Leningrad Physico-Agronomical Institute, and the diversified individual experimentation all over the USSR are of the highest importance in understanding the nature of life at the plant level.

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"The roots respond as living material to the stimulus of centrifugal force and of gravity and do not simply follow, as dead matter does, the direction of the resultant of the forces applied to them. Accordingly one should expect that the basic relation between the response and the stimulus be logarithmic as predicted by Weber-Fechner's rule, though various factors might modify this fundamental relation. The inconsistancy observed by almost all authors, namely, that various roots take up different angles when stimulated by the same force, is explained by the individual sensitivity to stimulation, a property presented only by living matter."
(Abs. B. Luyet) Biological Abstracts, #5650, October, quoting, Centrifugal Force and Gravity in Tropistic Stimulation; Small, James -- BIODYNAMICA 44(?). 1-12, 2 fig., 1939.

Rats closely duplicate the food preferences and dietary needs of man. Experience has shown that there is no one hunger but a score of specific hungers. Experiments at John Hopkins University and at the University of Illinois with rats having access

to a large number of important food elements showed that the animals took as much or as little of each food as they wanted; securing a diet better in terms of growth and health than the best approved diet worked out by specialists on rat diet. Sick rats prescribed for themselves a corrective diet. Diabetic rats avoided sugar although it was freely acessible. Rats with no adrenal glands ate the extra salt they needed to keep alive. Rats fed sugar voluntarily decreased the amount of other food to compensate for increased calories from sugar, while rats fed saccharine, which is also sweet but has no food value, increased their food intake. The taste buds of the tongue play a large part in the choice; however, the guiding intelligence in the choice of the required diet is referred to as Nature. The question is; "Has the appearance of individuality in man mashed this useful instinct in man, and are the eating instincts of children (recognized by allergists as important) the remains of this group-wisdom in animals ?"

(Summarized from an article by M. Van de Water Science News Letter 23/11/40)

STATE OF THE MASSES, by Emil Lederer — SOCIAL ORDER: Editorial Notice

Very little is really understood of principles underlying the social order of India. One gap concerns the dynamic aspect of caste in history. The historical process is regarded as patterned and cyclic, and the castes take direction of society in rotation. In Europe this would correspond to the domination first attained and then lost by the officials of the Christian religion, (the Brahmins, teachers and priests); followed by the assumption of power by feudal lords, (the Kshattriyas); then the supplanting of princedoms by great banking houses, (the vaishyas as a group, banking and industry). The doctrine states that the fourth and last caste, the sudras or masses, is now coming into power, and that the series of political revolutions was the prelude to economic revolutions indicating the dying phase of international banking supremacy.

In Indian philosophy, history, is a natural phenomenon, and man's power of events is purely local in time. In this view the efforts that count are those which go to make a transition to the new state of affairs complete, peaceful and conscious.

Considered in this framework, such a book as State of the Masses, by the late Emil Lederer (Norton and Co., 1940) seems, as confused in principle as it is admirable in its exactness. Fascism is by no means a new kind of social order. It is natural that men like Hitler should arise to embody in themselves the mass-mind of the race they belong to. There is, however, a great deal of difference between the movements of masses in each great geographic and ethnic unit. The difference between Russia and Germany and Italy will be most easy to point out. In Russia there are two stages of transition: The present, Bolshevism, has all along been declared a temporary measure; The second, Socialism, is to come. Nothing like this is seen in the Nazi-Fascist states, where what now obtains is supposed to be the final state, to last as is, for a thousand years, no less. American circles do not sufficiently perceive that the Nazis represent a body (and the Fascists the tail) of an animal very different from the Russian totalitarianism, because of this profound psychological factor. In Russia the dynamism is centrifugal and toward stage two, and war is a nuisance. In Germany the dynamism of nazism has from the start been belligerent, centripetal, conceiving war a fine thing in itself. We are not estimating the world-causes for this state of affairs, in which every state is to blame. We are only pointing out psychological forces which, geared into inner cyclic workings of history, will lead various nations to various places in a new mass-order. The Russian vector points to a high place in the subsequent society; the German directions and velocity to a low, if the thesis of Indian thought is accepted.

Similar estimates can be made of the place of Britain, the United States, and other countries by gauging democracy in its local psychological strength. The survivors in the new, fourth, epoch of the historical sequence are determined as much by inner force as by outer circumstance. In long wars of attrition, sea powers, other things being equal, invariably win. In a mass-era the force of democratic idealism, even if it has spent itself vainly for years without achieving economic democratic fullness, accumulates as a psychic potential tending toward democracy and forms a bouyant medium which the fated epoch can use. It is along these lines the history for our times can be studied in fresh ways.

STATE OF THE MASSES, Emil Lederer, Norton, N.Y., 1940, 245 pp. $2.50.

THE NEW ERA — SOCIAL ORDER: Items

Newspapers everywhere use column heads such as "Building the New Europe" (this in the Springfield Republican), and the deepest disappointment will be felt in every quarter if British war aims turn out to be common-places about territory. The

New Yorker addresses an open letter to Mr. Churchill (written by Clifton Fadiman) calling Mr. Churchill's attention to Harold Laski's book, Where Do We Go From Here ? The Springfield Daily Republican writes a full column lead on "India and Ireland", enlightened and temperate. It opens: "The British colossus has always had so many feet of clay that no one bothers to enumerate them, but in critical times one or more of them gives trouble." Those who believe that

Heaven doth with us as we with torches do,
Not light them for themselves

suspect that England will lie compelled to deal adequately with these long over-due inheritances of an evil past.

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In England itself the series of broadcasts by J. B. Priestly, has affirmed the passionate desire of all for a new order. These addresses (praised in Nature, 2/11/40) are the main content of Priestly's book, Britain Speaks, just published by Harpers and Brothers (New York, $2.50). J. B. Reston writes (N. Y. Times 8/12/40) "There is a great stirring of social consciousness among the people of Great Britain." Everyone fears a relapse from this exalted state. If the forces of deliberate self-analysis could be loosed in the United States. It would help Britain tremendously.

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Mr. Bevin said Oct. 9, that the cabinet has decided against a Ministry of Reconstruction. Instead a new office, Minister of Works and Buildings, has been created, Lord Reith, first incumbent. An editorial in Nature (23/11/40) regards Mr. Atlee's speech of Oct. 24 and Lord Reith's of Nov. 13 as somewhat disappointing: "....the functions of the new Ministry....do not inspire the vision of a New England". The same issue of Nature cites Walter Lippman with approval: "The muddle of the democracies comes from something deeper than their form of government; it comes from the gradually accelerated destruction of all convictions about the nature of man and his destiny."

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A committee of seventeen distinguished persons headed by Dr. W. A. Neilson, retired president of Smith College met about two years ago, and again at Atlantic City last May, to start drafting the outlines of a new social order. They have published The City of Man (Viking Press), advocating the resumption of the efforts of Plato and others, and the continuation of the Old Testament of Americanism (Mayflower agreement, Declaration of Independence, Wilson's plea for the League to the Senate) into a New Testament. (Herald Tribune 29/11/40)

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The Commission to Study the Organization of Peace met under the chairmanship of Dr. James T. Shotwell, Columbia University professor of history. The 67 members include Dr. Neilson, Clarence Streit (author of Union Now), and others. This group issues a report to the effect that the national sovereignty of a state is no longer an adequate standard for human affairs.

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America's Town Meeting of the Air on November 29th was devoted to the question, "What Kind of a World Order Do We Want ?" as answered by H. G. Wells, Dr. Hu Shih (Chinese Ambassador), and Dr. Ray Lyman Wilbur. The answers were broad but it all adds to the momentum of the times toward new outlooks.

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The task of science is here placed on a broader platform than that of the common belief that it is (a) to predict and control events, (b) to formulate relations of cause and effect, (c) to "explain" phenomena. For, in point of fact and history, the prediction and control, and its concomitant the making of useful inventions, has been made possible only by a growing body of culture proceeding from what is often called "pure science". Hence, says the author "the task of science cannot be to predict and control, for that would leave pure science with no task".

As for (b) and (c), they are bound up with each other, and Dr. Lee's discussion seems to indicate that they are naive or popularizing versions rather than intelligent statements of science's work. Science studies order systems in nature, and as has been emphasized by G. N. Lewis ("The Anatomy of Science", 1926), the notion of cause is not only unnecessary but often a handicap to understanding the orderly relationship in such a system. At first blush description may seem, as it seemed to Max Planck (founder of quantum theory), an inadequate characterization of science's job, but not if we do not mean by it a limited type of synchronic description.

The full discovery and description of orderly systems in nature procedes as it were by taking sections in space-time in different ways -- thus the section may be synchronic or across the flow of time ("all at the same time") like the anatomical description of the human body, or it may be diachronic, telling of the pattern of changes along time; or it may be "slanting" in various ways and so probe into phenomena best understood by a space-time approach. There are also various levels of generality, from point-by-point reporting to statements generally true through a large extent of space or time or both. Gnomic, i.e. time-generalized, diachronic descriptions are usually statements of "cause and effect", but clearly science entails all sorts of descriptive statements besides this particular type.

Along with this dethronement, though not necessarily elimination, of the idea of causality, goes emancipation from the misleading notions aroused by the popular word "explain". Dr. Lee makes it clear to this reviewer at least that the real job is one of finding and dealing with correlations, and illustrates how the feeling that an explanation has been found acts as a block to a real understanding of the array of factors that clamor for further investigation. He would, and I think rightly, substitute the term "understood" for "explain"; and understanding involves deeper knowledge than the one-way diachronic relation which "explanation" tends to regard as sufficient.

Modern science has entered a phase of growth which demands wider horizons. The application of many different order-types to a given situation replaces the more limited set of order-types which science in its earlier phase held sufficient. Experimentation with radically new order-types began perhaps with the great mathematicians such as Riemann, Lobachevsky, Bolyai and Minkowski, and led to new geometries, and continuums of more than three dimensions, and to the later discovery of the validity of these new order-types for description of certain fields of fact. The theory of relativity uses Riemannian geometry.

Formulation of abstract order systems is the business of logic in its modern form, which goes under various names such as Symbolic, Mathematical, Relational Logic, etc. It would seem to follow that the task of science on the intellectual side is to substitute for the restricted notions listed as (a), (b), (c) above the technique of a rigorous but also free, ever-developing logic in this modern sense which has so far developed only in mathematics.

Lee's paper comes to a climax, with the words "Those sciences whose data are subject to quantitative measurement have been most successfully developed because we

know so little about order systems other than those exemplified in mathematics. We can say with certainty, however, that there are other kinds, for the advance of logic in the last half century has clearly indicated it. We may look for advances in many lines at present well founded if the advance of logic furnishes adequate knowledge of other order types. We may also look for many subjects of inquiry whose methods are not strictly scientific at the present time to become so when new order systems are available." To this reviewer, every sentence in this quotation is worthy of the most profound meditation.

MODERN LOGIC AND THE TASK OF THE NATURAL SCIENCES Harold N. Lee, Tulane University, - article in Sigma Xi Quarterly, Nov. 1940.

Main Currents IN MODERN THOUGHT To Our Colleagues.

Subscription to MAIN CURRENTS is on a service basis. How valuable is it, and to what effective use can you put it ? Correspondence is invited. The colour scheme is significant, not merely arresting. Biology and psycho-biology are found (in sequence) on green; Psycho-biology in man is on pink; anthropology blue; social man orange. The physical sciences are on yellow. White is reserved for basic methods (mathematics, etc.) and for general notices of conferences, publishers' doings. The purposes of MAIN CURRENTS were notified at length in the first issue, and will be referred to at intervals in various forms. Briefly, Nature is our only guide, and we do not fear enlargement by that guide of our vistas into worlds of higher dimensional resource, nor any other consequences of idealistic realism. We regard these first issues as experimental, and suggestions will be highly prized during the formative period. Help will be most welcome, and if MS is arranged in the manner seen in this issue, it will be appreciated: Quotations from sources, please to be clearly enclosed in quotation marks; dates, sources, pages adequately cited. We shall later print a note on principal sources. A medium course between the over-technical and the over-simple is our intention; and we are trying to keep the page clear of interrupting source notations without sacrificing dependability. Correspondents are invited to ask for more details, as to items which seem to them crucial. In the end, we believe, the filed-away sheets of MAIN CURRENTS will provide the abstract for a unified philosophical grip upon the data of our times. It is well known that after centuries have passed, what appear to have been great complicated systems smooth out into quite simple working principles. It may seem arrogant to suggest that detachment can be accomplished while the materials flow past. But we believe that a super-simplification is already appearing, and we propose to feel our way along toward it. Furthermore, detachment in some measure is assured those who draw impartially and with equal gratitude on experience ancient and modern, eastern and western, subjective and objective, artistic and natural, religious and scientific. We invite collaboration, criticism, and support.